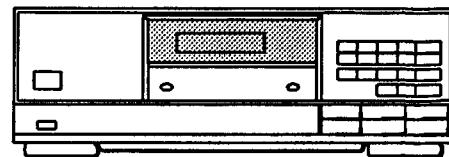


AIWA®

DX-D91

SERVICE
MANUAL

COMPACT DISC PLAYER

- BASIC CD MECHANISM : KSL-150ACM3

- TYPE. Y,YK

◆ DX-D91 is the Compact Disc Player
which is connected to MX-D91/D86 only.

SPECIFICATIONS

Type:	Compact disc digital audio system
Disc:	Compact disc
Scanning method:	Non contact optical scanner (semiconductor laser application)
Laser:	Semiconductor laser ($\lambda=780$ nm)
Rotation speed:	Approx. 500 rpm - 200 rpm (CLV) Approx. 900 rpm - 360 rpm (CLV) (at high speed) (only when connected to the FX-W919 or FX-W868 cassette deck)
Error correction:	Cross Interleave, Reed Solomon code
No. of channels:	2 channel
D-A conversion:	16-bit linear
Wow/Flutter:	Unmeasurable
Dimensions:	360 (W) x 118 (H) x 304 (D) mm
Weight:	3.4 kg
Frequency response:	10 Hz - 20 kHz, ± 1 dB
Harmonic distortion:	0.015% (1 kHz, 0 dB)
Dynamic range:	92 dB
Channel separation:	84 dB (1 kHz, 0 dB)
S/N ratio:	96 dB (1 kHz)

- Design and specifications are subject to change without notice.

CAUTIONS WHEN SERVICING

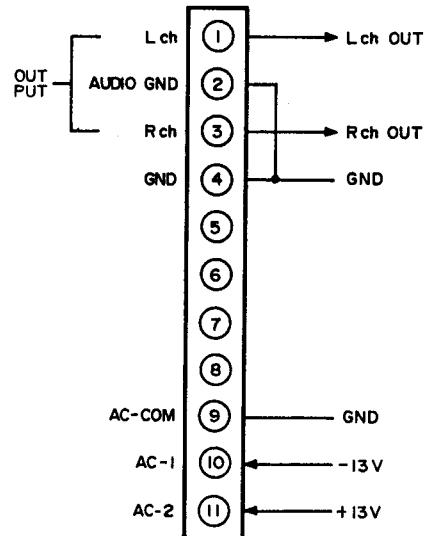
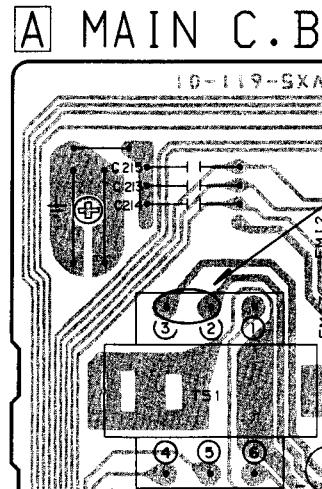
The DX-D91 has no power supply circuit. Power should be supplied from MX-D91, D86 using an 11-core flat cable. During repair, connect DX-D91 to the MX-D91, D86 to supply the power. When there is no MX-D91, D86, supply the power in the manner below.

(When repairing without MX-D91, D86)

1. Remove soldering from ② and ③ terminals of T51 not to flow DC through T51.
2. Connect the Multi-Power Supply(LPS-9088) in the manner below.

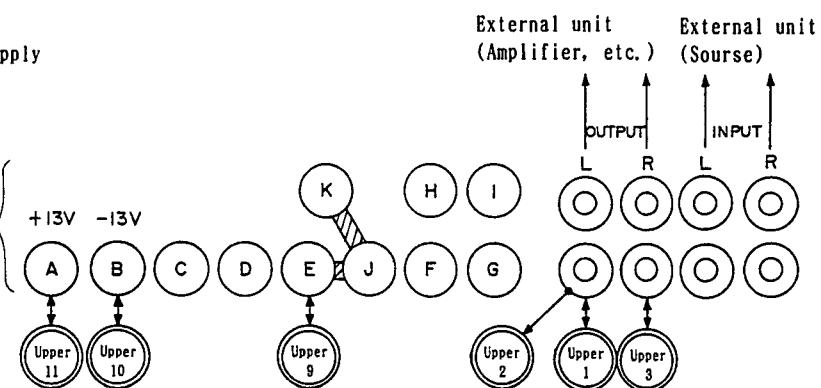
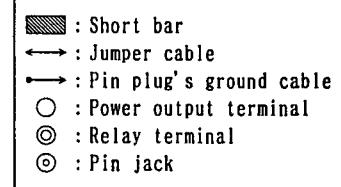
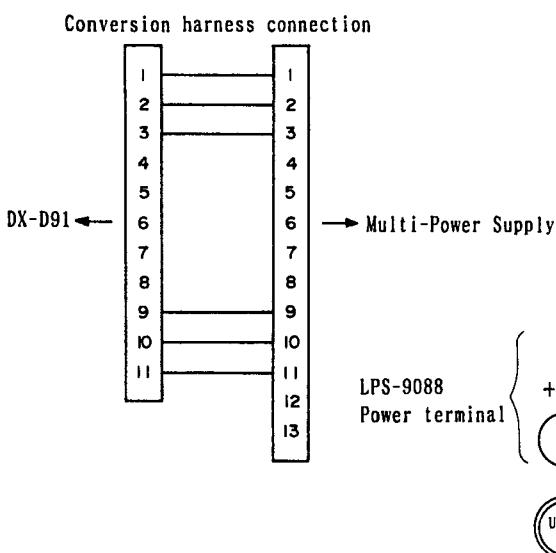
• FL51 does not light, as AC power for FL51 is not supplied.

The voltages below are supplied to each CON101 terminal from the external power source.



3. Multi-Power (LPS-9088) Connection

Connect to J1 of the LPS-9088 using a multi-conversion harness.



■ ACCESSORIES/PACKAGE LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
1	★89-VX5-904-019		INSTRUCTION BOOKLET (Y)	※	1
2	★89-VX5-914-018		INSTRUCTION BOOKLET (Y, YK)	※	1

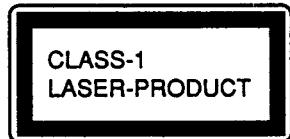
PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs laser. Therefore, be sure to follow carefully the instructions below when servicing.

WARNING!!

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

This Compact Disc player is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT label is located on the rear exterior.



CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

ATTENTION

L'utilisation de commandes, réglages ou procédures autres que ceux spécifiés peut entraîner une dangereuse exposition aux radiations.

"Varoitus! Suojakotelo ei saa avata. Laite sisältää laserdiodin, joka laheitää näkymätöntä silmille vaarallista lasersäteilyä."

ADVARSEL!



Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

"Denna apparat innehåller laserkomponenter som avger laserstråling som överskrider gränsen för laserklass 1."

DISASSEMBLY INSTRUCTIONS

1. "Tray" Removal

- 1) Remove the "Cabinet, Steel".
- 2) For AUTOMATIC operation
Press the OPEN/CLOSE button to eject the "Tray".

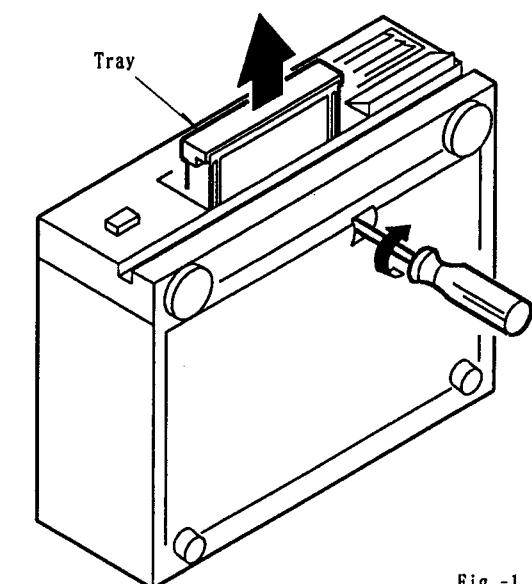


Fig. -1

2. "CD Mechanism" Removal

- 1) Remove 4 screws Ⓐ and remove "MAIN C. B".
- 2) Loosen 2 screws Ⓑ, remove 3 screws Ⓒ and remove "CD Mechanism". (See Figure-2)

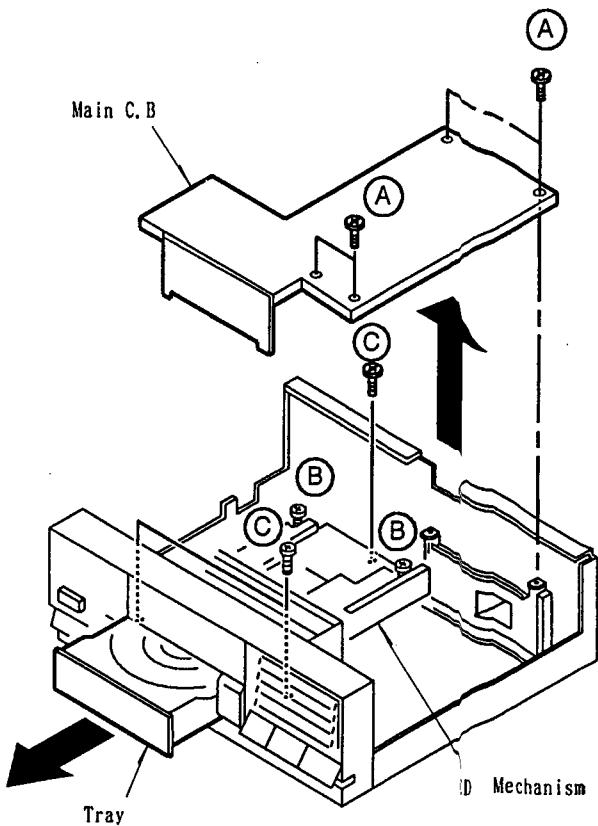


Fig. -2

ELECTRICAL MAIN PARTS LIST

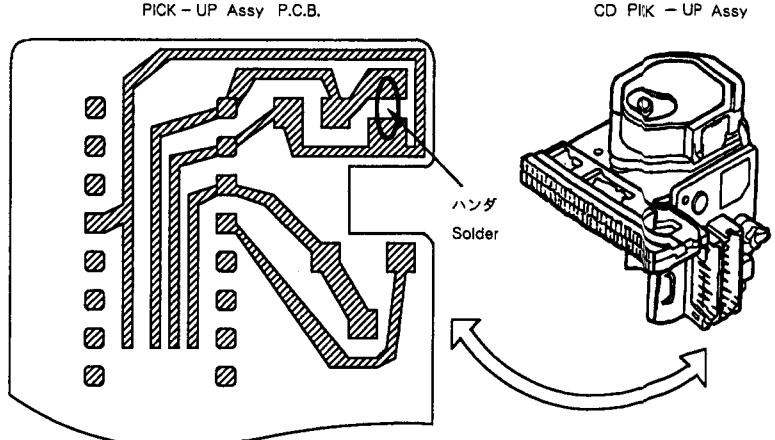
REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
==IC==					
87-001-184-010	IC, CXA1081S		C152	*87-010-374-019	CAP, ELECT 47-10V
87-020-794-010	IC, CXA1082BQ		C201	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y
87-020-795-010	IC, CXD1135Q		C202	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y
87-001-888-010	IC, CXK5816PN-12L		C203	*87-010-374-019	CAP, ELECT 47-10V
89-VX5-615-010	IC, CXP5058H-554Q		C204	*87-010-404-019	CAP, ELECT 4.7-50V SME
87-001-561-019	IC, HD74HC02P(Y)		C205	*87-018-127-019	CAP, CERA-SOL U 470P-50 B
87-001-196-019	IC, ICPN10		C206	*87-018-127-019	CAP, CERA-SOL U 470P-50 B
87-001-132-019	IC, ICPN38		C207	*87-018-127-019	CAP, CERA-SOL U 470P-50 B
87-001-173-019	IC, LA6510		C208	*87-018-127-019	CAP, CERA-SOL U 470P-50 B
87-027-895-019	IC, M5218L		C209	*87-018-127-019	CAP, CERA-SOL U 470P-50 B
87-020-619-019	IC, M5238L		C210	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y
87-020-758-019	IC, NJM2068SD(Y)		C211	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F
87-027-986-019	IC, NJM4560SA		C212	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B
87-020-881-019	IC, NJM78L05A		C213	*87-018-131-019	CAP, CERA-SOL U 100P-50 B
87-001-169-010	IC, STA341M		C214	*87-018-119-019	CAP, CERA-SOL U 100P-50 B
87-001-865-010	IC, TDA1543A		C215	*87-018-119-019	CAP, CERA-SOL U 1000P-50 B
==TRANSISTOR==					
89-110-154-019	TRANSISTOR, 2SA1015Y		C301	*87-010-545-019	CAP, ELECT 0.22-50V SME(Y)
89-112-964-019	TRANSISTOR, 2SA1296Y		C303	*87-018-097-019	CAP, CERA-SOL 2.2P(Y)
89-213-702-019	TRANSISTOR, 2SB1370E		C304	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F(Y)
89-318-155-019	TRANSISTOR, 2SC1815GR		C307	*87-018-149-019	CAP, CERA-SOL U 15P-50 CH(Y)
89-318-154-019	TRANSISTOR, 2SC1815Y		C309	*87-018-150-019	CAP, CERA-SOL U 18P-50 CH(Y)
89-320-011-019	TRANSISTOR, 2SC2001K		C310	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B(Y)
89-420-612-019	TRANSISTOR, 2SD2061E		C311	*87-018-114-019	CAP, CERA-SOL U 39P-50 SL(Y)
87-026-216-019	TRANSISTOR, DTA124ES		C312	*87-018-111-019	CAP, CERA-SOL U 27P-50 SL(Y)
87-026-217-019	TRANSISTOR, DTC124ES		C313	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y(Y)
87-026-218-019	TRANSISTOR, DTC144ES		C314	*87-010-374-019	CAP, ELECT 47-10V(Y)
==DIODE==					
87-027-376-019	DIODE 1B4B41		C315	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B(Y)
87-027-975-019	DIODE 1S1588		C316	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F(Y)
87-001-559-019	DIODE 1SS131		C317	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F(Y)
87-020-110-019	DIODE 1SS177		C320	*87-018-119-019	CAP, CERA-SOL U 100P-50 B(Y)
87-027-451-019	DIODE, ZENER HZ27-2L		C351	*87-010-374-019	CAP, ELECT 47-10V
87-001-566-019	DIODE, ZENER HZ2B-1		C352	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y
87-027-332-019	DIODE, ZENER HZ6B1L		C353	*87-018-114-019	CAP, CERA-SOL U 39P-50 SL(Y)
==MAIN CIRCUIT BOARD SECTION==					
C1	*87-010-262-019	CAP, ELECT 3300-16V SME	C353	*87-018-114-019	CAP, CERA-SOL U 39P-50 SL(Y)
C2	*87-015-997-019	CAP, ELECT 2200-16V SME	C353	*87-018-113-019	CAP, CERA-SOL U 33P(YK)
C3	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y	C354	*87-018-111-019	CAP, CERA-SOL U 27P-50 SL(Y)
C4	*87-010-384-019	CAP, ELECT 100-25V SME	C354	*87-018-113-019	CAP, CERA-SOL U 33P(YK)
C5	*87-010-384-019	CAP, ELECT 100-25V SME	C355	*87-010-400-019	CAP, ELECT 0.47-50V SME
C51	*87-010-247-019	CAP, ELECT 100-50V SME	C357	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y
C53	*87-010-405-019	CAP, ELECT 10-50V SME	C358	*89-018-104-019	CAP, CERA-SOL U 10P
C54	*87-010-382-019	CAP, ELECT 22-25V SME	C359	*89-018-104-019	CAP, CERA-SOL U 10P
C55	*87-010-382-019	CAP, ELECT 22-25V SME	C360	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F
C101	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B	C401	*87-018-132-019	CAP, CERA-SOL U 2200P-16 X
C102	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B	C402	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y
C103	*87-018-205-019	CAP, CERA-SOL U 0.022-25 F(Y)	C404	*87-018-205-019	CAP, CERA-SOL U 0.022-25 F
C104	*87-018-205-019	CAP, CERA-SOL U 0.022-25 F(Y)	C408	*87-010-404-019	CAP, ELECT 4.7-50V SME
C107	*87-010-405-019	CAP, ELECT 10-50V SME	C410	*87-010-545-019	CAP, ELECT 0.22-50V SME
C108	*87-010-405-019	CAP, ELECT 10-50V SME	C411	*87-010-404-019	CAP, ELECT 4.7-50V SME
C111	*87-014-039-019	CAP, PP 180P-100 J	C413	*87-010-401-019	CAP, ELECT 1-50V SME
C112	*87-014-039-019	CAP, PP 180P-100 J	C414	*87-010-404-019	CAP, ELECT 4.7-50V SME
C113	*87-010-263-019	CAP, ELECT 100-10V	C415	*87-018-133-019	CAP, CERA-SOL U 4700P-16 X
C114	*87-010-263-019	CAP, ELECT 100-10V	C416	*87-010-382-019	CAP, ELECT 22-25V SME
C115	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y	C417	*87-010-263-019	CAP, ELECT 100-10V
C116	*87-018-134-019	CAP, CERA-SOL U 0.01-16 Y	C418	*87-010-263-019	CAP, ELECT 100-10V
C117	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B	C422	*87-018-205-019	CAP, CERA-SOL U 0.022-25 F
C118	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B	C423	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F
C120	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F	C424	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F
C121	*87-010-248-019	CAP, ELECT 220-10V SME	C425	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F
C122	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F(Y)	C451	*87-018-132-019	CAP, CERA-SOL U 2200P-16 X
C123	*87-018-131-019	CAP, CERA-SOL U 1000P-50 B	C453	*87-010-374-019	CAP, ELECT 47-10V
C151	*87-010-374-019	CAP, ELECT 47-10V	C457	*87-010-263-019	CAP, ELECT 100-10V
			C459	*87-010-793-019	CAP, ELECT BP 0.47-50V SRA
			C460	*87-015-684-019	CAP, ELECT 47-25V
			C461	*87-015-684-019	CAP, ELECT 47-25V
			C462	*87-010-263-019	CAP, ELECT 100-10V
			C463	*87-010-374-019	CAP, ELECT 47-10V
			C653	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F
			C654	*87-018-209-019	CAP, CERA-SOL U 0.1-50 F
			D301	*87-001-835-019	VARI-CAP, KV-1560(Y)

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
EM11	*87-008-372-019	FILTER EMI BL 0IRNI	SW513	87-036-142-019	TACT SW(PLAY/REPLAY)
EM12	*87-008-372-019	FILTER EMI BL 0IRNI	SW514	87-036-142-019	TACT SW(▶/◀)
EM13	*87-008-372-019	FILTER EMI BL 0IRNI	SW515	87-036-142-019	TACT SW(2)
EM1101	*87-008-372-019	FILTER EMI BL 0IRNI	SW516	87-036-142-019	TACT SW(7)
EM1102	*87-008-372-019	FILTER EMI BL 0IRNI	SW517	87-036-142-019	TACT SW(REPEAT/BLANK)
EM1103	*87-008-372-019	FILTER EMI BL 0IRNI	SW518	87-036-142-019	TACT SW(PAUSE)
FL51	*89-VX5-616-010	FL, 9-BT-65G(DISPLAY)	SW519	87-036-142-019	TACT SW(◀/▶)
△FR2	87-029-124-019	RES, FUSE 2.2-1/4W	SW520	87-036-142-019	TACT SW(1)
L101	*87-005-406-019	COIL CHOKE 560UH	SW521	87-036-142-019	TACT SW(6)
L102	*87-005-406-019	COIL CHOKE 560UH	SW522	87-036-142-019	TACT SW(DISPLAY)
L103	*87-003-147-019	COIL CHOKE 22UH	SW523	87-036-142-019	TACT SW(STOP/CLEAR)
L201	*87-003-147-019	COIL CHOKE 22UH	SW524	87-036-142-019	TACT SW(OPEN/CLOSE)
L301	*87-003-147-019	COIL CHOKE 22UH(Y)	==SWITCH CIRCUIT BOARD SECTION==		
L302	*81-692-626-019	COIL CHOKE VCO(Y)	SW551	87-036-087-019	SLIDE SW(TIMER)
L351	*87-003-147-019	COIL CHOKE 22UH(Y)	SW552	87-036-142-019	TACT SW(POWER)
L451	*87-003-147-019	COIL CHOKE 22UH	==MOTOR-1 CIRCUIT BOARD SECTION==		
R352	*87-025-426-019	RES, MF 22K-1/6W F	※PCB-D	91-625-848-119	MOTOR 1 C. B(RF-310T-11400)
R353	*87-025-426-019	RES, MF 22K-1/6W F	※PCB-D	91-628-263-119	MOTOR 1 C. B(MDN-4RA3NTAS/4RA3ETA)
SFR301	*87-024-169-019	SFR, 2. 2K(Y)	※M1	9X-264-077-019	MOTOR GEAR ASSY(SLED) (RF-310T-11400)
SFR401	*87-024-173-019	SFR, 22K	※M1	9X-264-134-419	MOTOR GEAR ASSY(SLED)(MDN-4RA3ETA)
SFR402	*87-024-173-019	SFR, 22K	※M2	9X-264-133-719	MOTOR ASSY(W/CHASSIS, T.T)(SPINDLE) (MDN-4RA3NTAS)
SFR403	*87-024-168-019	SFR, 1K	※M2	9X-264-134-819	MOTOR ASSY(W/CHASSIS, T.T)(SPINDLE)
SFR451	*87-024-173-019	SFR, 22K	SW1	91-570-822-219	LEAF SW(INSIDE LIMIT)
SFR452	*87-024-173-019	SFR, 22K	==MOTOR-2 CIRCUIT BOARD SECTION==		
T51	*89-VX5-627-019	TRANSFORMER FL	M3	9X-264-133-619	MOTOR ASSY(LOADING)
TC301	*87-011-224-019	CAP, TRIMMER 30P(Y)	==MISCELLANEOUS==		
X201	*87-008-394-019	CERAMIC CST 4. 19MGW	98-848-046-519	PICK UP KSS-150A(H)(RP)	
X301	*89-VX5-623-019	CRYSTAL 15. 2MHZ(Y)	★89-VT5-202-010	BUSHING, CORD	
X351	*84-719-610-019	CRYSTAL 8. 4672MHZ	89-VX5-618-010	FLAT CABLE 11P	
==FRONT CIRCUIT BOARD SECTION==			SW2	91-571-312-119	LEAF SW(OPEN/CLOSE)
SW501	87-036-142-019	TACT SW(5)	※Caution		
SW502	87-036-142-019	TACT SW(0)	Two Types of the spindle (DISC) motor and sled motor are used, but they are not compatible.		
SW503	87-036-142-019	TACT SW(+10)	Check the part numbers (MDN, RF) on the labels of motors and replace motors with the same one.		
SW504	87-036-142-019	TACT SW(RANDOM)			
SW505	87-036-142-019	TACT SW(4)			
SW506	87-036-142-019	TACT SW(9)			
SW507	87-036-142-019	TACT SW(DELETE)			
SW508	87-036-142-019	TACT SW(AUTO)			
SW509	87-036-142-019	TACT SW(CONT)			
SW510	87-036-142-019	TACT SW(3)			
SW511	87-036-142-019	TACT SW(8)			
SW512	87-036-142-019	TACT SW(PROGRAM/CHECK)			

Precaution to replace Optical block (KSS - 150A)

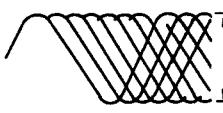
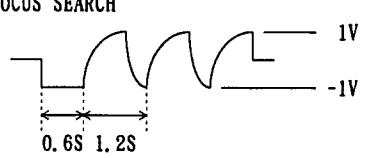
Body or clothes electrostatic potential could ruin laser diode in the optical block. Be sure ground body and workbench, and use care the clothes do not touch the diode.

- 1) After the connection, remove solder shown in figure below.



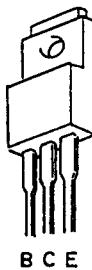
WAVE FORM VOLTAGE

SCHEMATIC DIAGRAM POINT	VOLTAGE, WAVEFORM
①	20V AC power supply voltage
②	3.4V AC filament voltage
③	-25.0V VFDP
④	-36.0V
⑤	12.0V +B
⑥	-13.0V -B
⑦ ⑧	5.4V } Base voltage of voltage -5.4V } regulator transistor
⑨ ⑩	4.8V } Regulated power -4.8V } supply voltage
⑪	5.0V Microcomputer power supply
⑫	RESET INPUT VDD ————— 5V RST ————— 100mS ————— 5V
⑬	P-CONT INPUT ON 5.5V OFF(STANDBY) -0.2V
⑭	P-OFF OUTPUT ON 0V OFF(STANDBY) 4.8V
⑮	P-OFF (DISPLAY ON/OFF) ON 4.0V OFF -32V

SCHEMATIC DIAGRAM POINT	VOLTAGE, WAVEFORM
⑯	RF signal level  P-P 1.4±0.3V
⑰	VCO input 4V 0 ————— 100mS ————— 4V Normally demultiplied output appears at CXD1135Q ⑰ pin.
⑱	VCO LPF OUT In play mode this voltage moves with in 0 ± 0.5V DC.
⑲	DAC I/V OUT 0dB test disc: 1.6V 1.45V(Min)~2.15V(Max)(tolerance)
⑳	EMP, H-EMP ON 3.6V OFF -5.6V
㉑	AUDIO MUTE ON 4.2V OFF -5.6V
㉒	FOCUS SEARCH  1V -1V 0.6S 1.2S



2SA1015
2SA1296
2SC1815
2SC2001

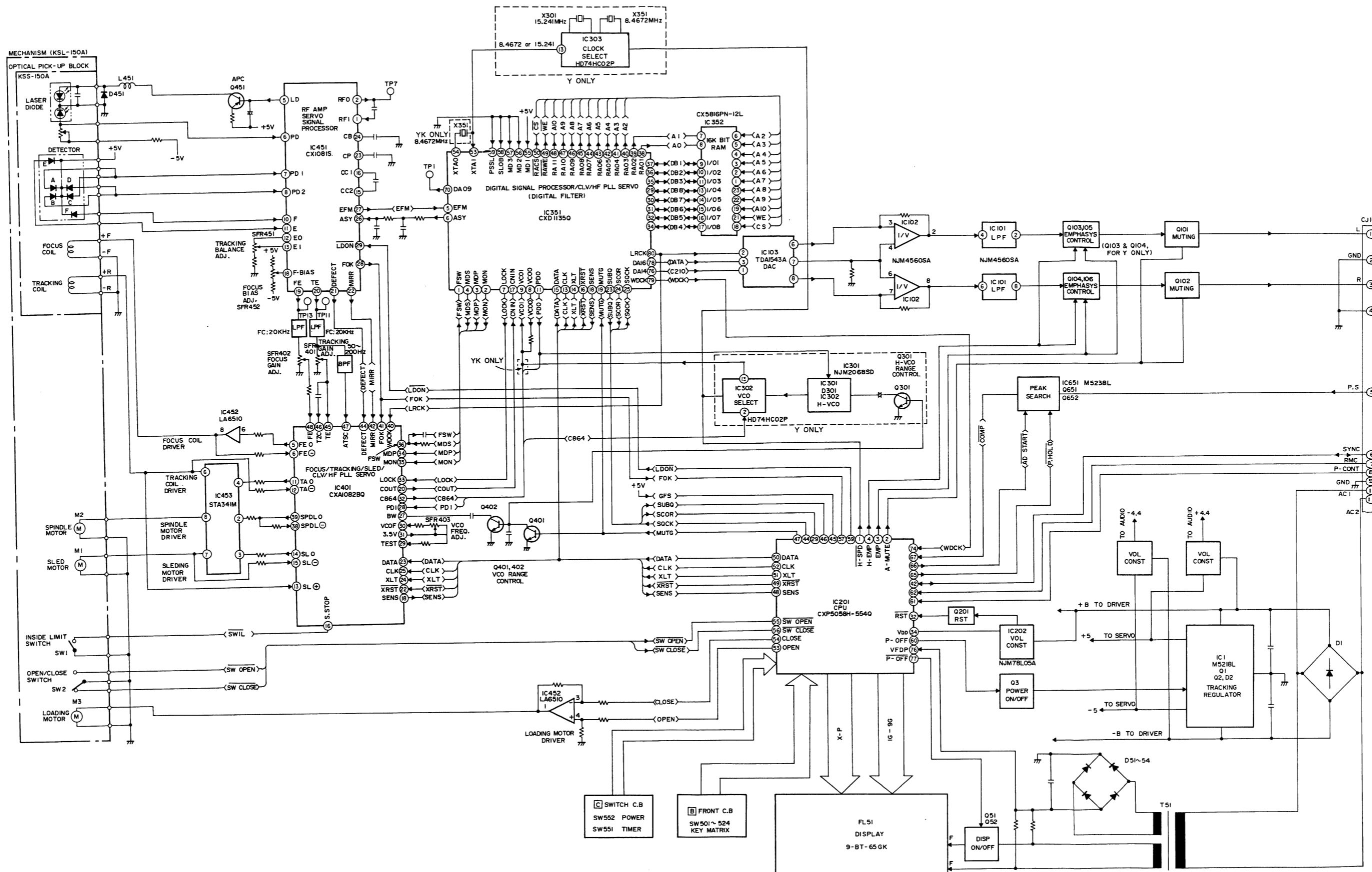


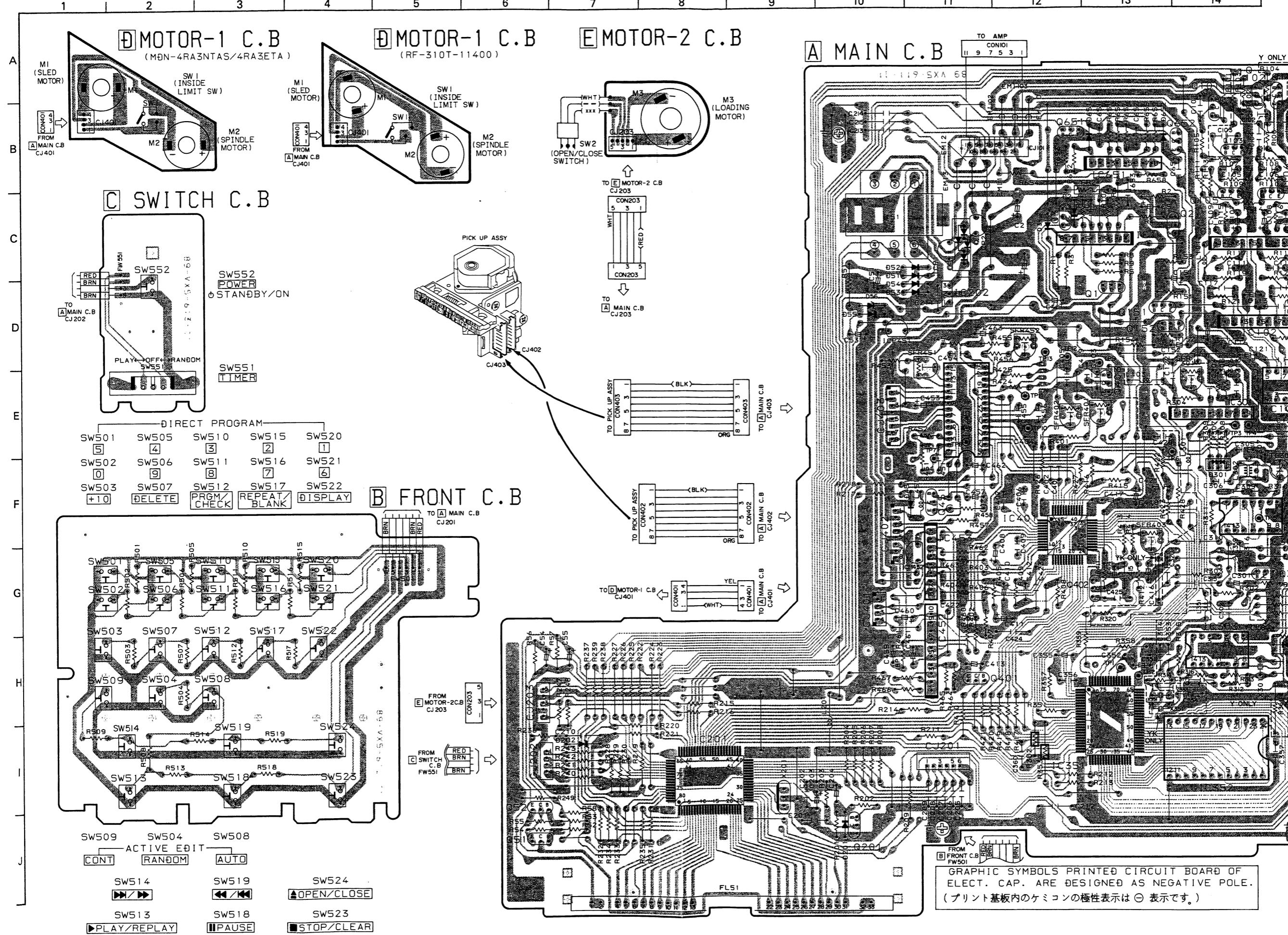
2SB1370
2SD2061



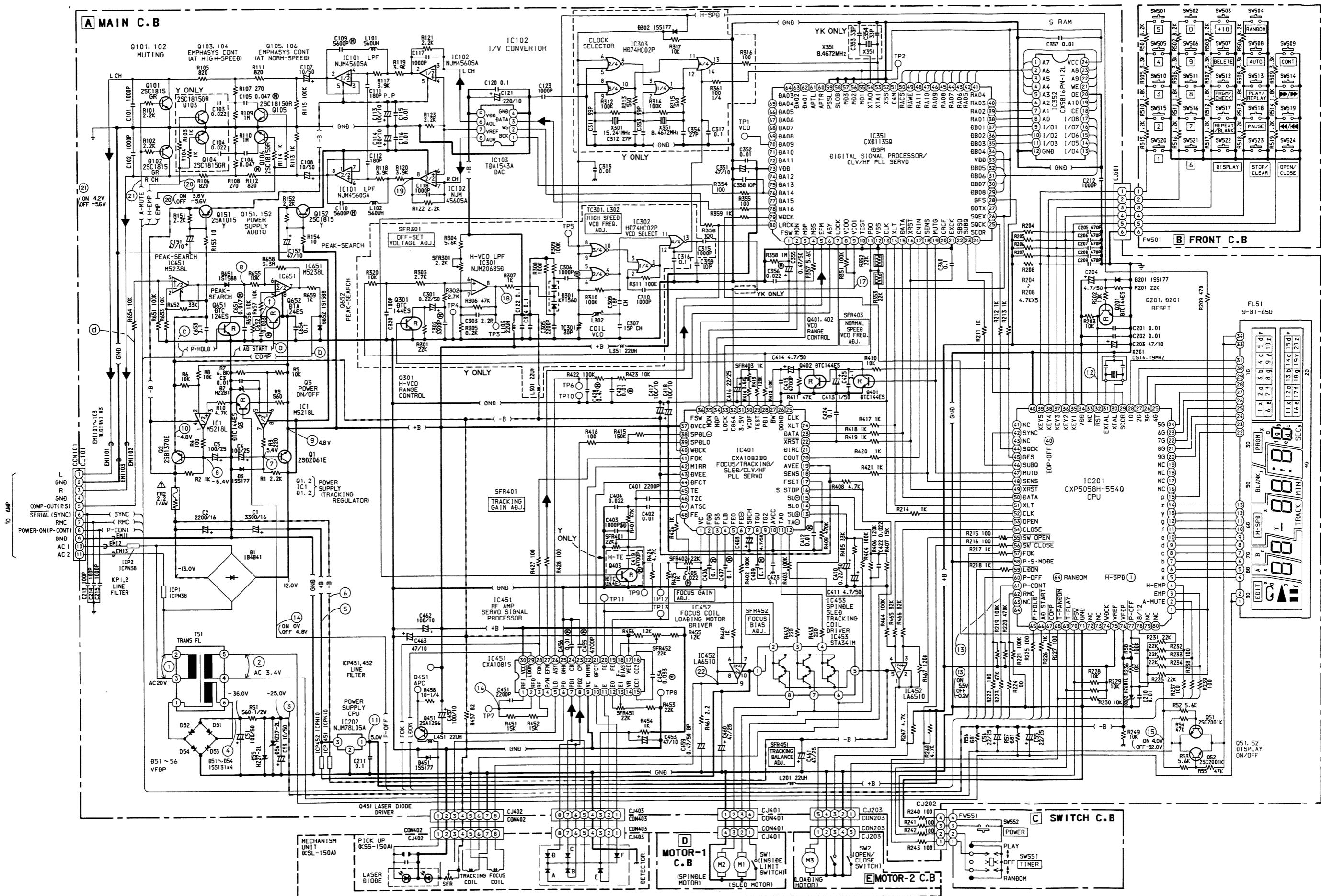
DTA124
DTC124
DTC144

BLOCK DIAGRAM

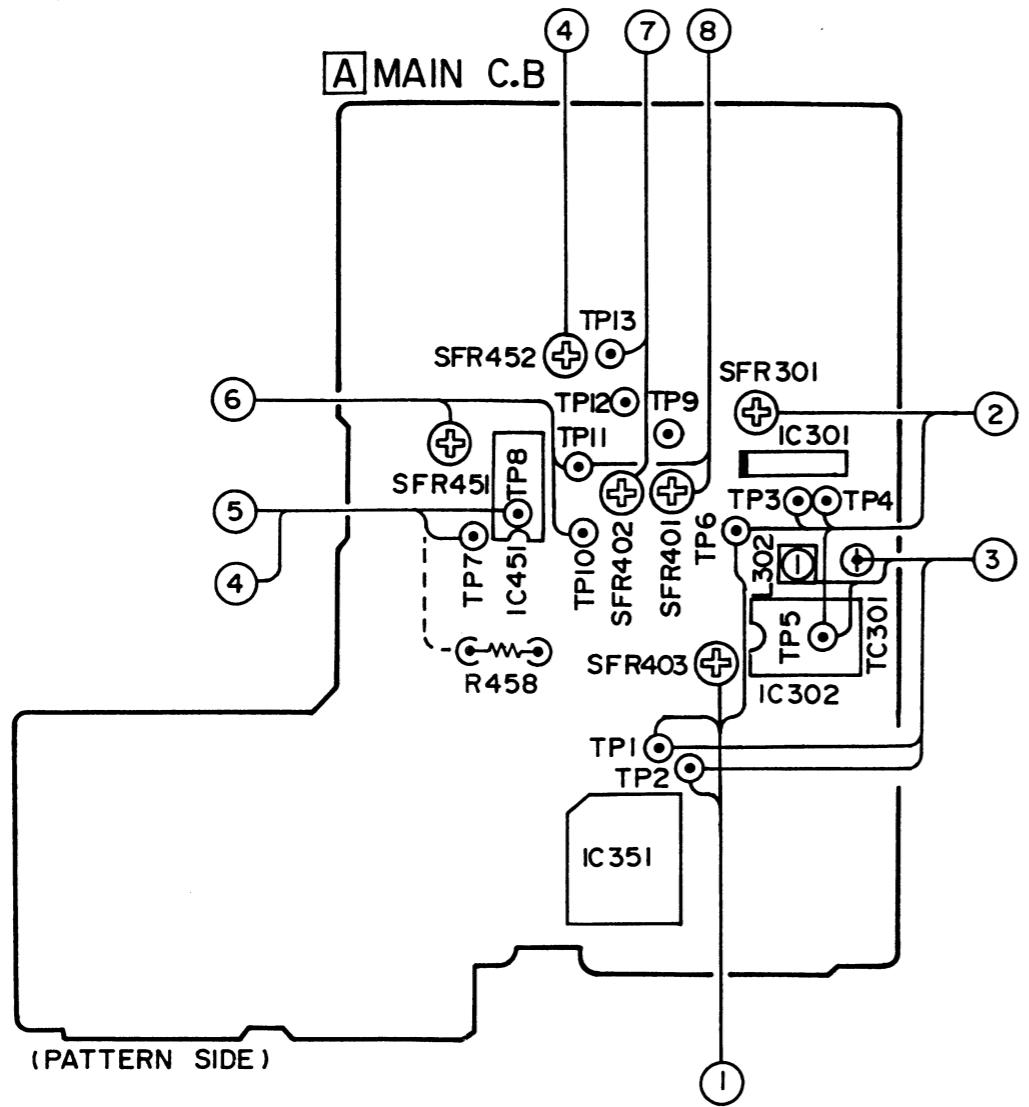




SCHEMATIC DIAGRAM



ADJUSTMENT



Note: Connect probe(10:1) of frequency counter and oscilloscope to test point.

① Normal Speed VCO Frequency Adjustment

1. Open the tray by pressing the OPEN/CLOSE button.
2. Short between test points TP6 (ASY) and TP4 (GND) using a short lead wire.
3. Connect the frequency counter to TP1 (VCO) and TP2 (GND).
4. Adjust SFR403(VCO) so that the frequency counter reading is 4.10 ± 0.02 MHz.
5. After this adjustment, remove the short lead wire from TP6 (ASY) and TP4 (GND).

② Offset Voltage Adjustment

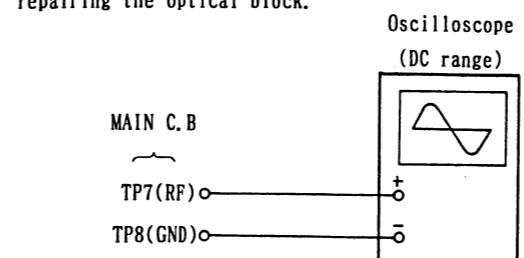
1. Connect a voltmeter to TP3 (PLLV) and TP4 (GND).
2. Turn the power switch on.
3. Open the tray by pressing the OPEN/CLOSE button.
4. Short between test points TP6 (ASY) and TP4 (GND) using a short lead wire. Also, short TP5 (H-SPD) and TP4 (GND).
5. Adjust SFR301 so that the voltages at TP3 (PLLV) and TP4 (GND) are 0 ± 0.05 V.
6. After this adjustment, remove the short lead wire from TP6 (ASY) and TP4 (GND).

③ High Speed VCO Frequency Adjustment (Y model only)

1. Put the unit in high speed mode by turning the power on while pressing the RANDOM and REPEAT/BLANK buttons.
2. Open the tray by pressing the OPEN/CLOSE button.
3. Short between test points TP6 (ASY) and TP4 (GND) using a short lead wire. Also, short TP5 (H-SPD) and TP4 (GND).
4. Connect the frequency counter to TP1 (VCO) and TP2 (GND).
5. Adjust SFR301 so that the frequency counter reading is 7.82 ± 0.005 MHz. If this specified value is not met, readjust using L302.
6. Turn the power off.
7. Check that the frequency in the normal speed adjustment is correct.
8. After this adjustment, remove the short lead wire from TP6 (ASY) and TP5 (H-SPD).

④ Focus Bias Adjustment

Make the focus bias adjustment when replacing and repairing the optical block.



1. Connect the oscilloscope to TP7(RF), TP8(GND).
2. Turn on the power switch.
3. Insert the disc YEDS-18 (YEDS-1) and play back the second track.
4. Adjust SFR452(F.B.) to make clear and maximize the waveform, diamond shapes (\diamond) can be distinguished in the center of the waveform.

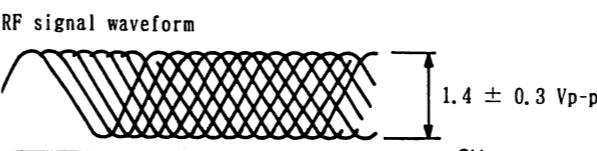


VOLT/DIV : 20mV
TIME/DIV : 0.5 μ sec

⑤ RF Waveform Check

This check should be performed whenever the optical system block is replaced.

1. Connect the oscilloscope to TP7 (RF) and TP8 (GND).
2. Turn the power switch on.
3. Insert the disc YEDS-18 (YEDS-1) and play back the data on the second track.
4. Adjust SFR on the pickup board so that a waveform appears in the oscilloscope as shown in the figure below.



VOLT/DIV: 20 mV
TIME/DIV: 0.5 μ sec

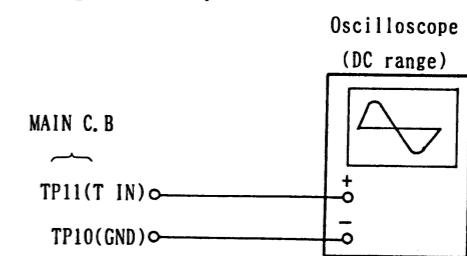
Note: The current of the laser signal can be checked by checking the voltage across R458(10 Ω).

The specified current value is shown on the label of the pickup. The difference should be ± 6.0 mA.

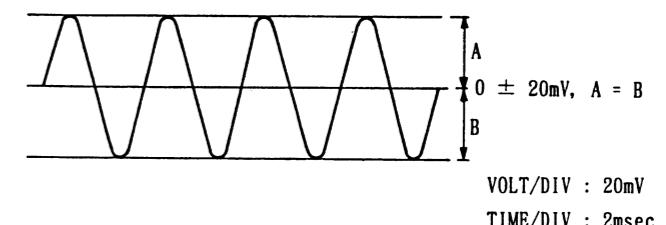
KSS-150A
15Y98
K464

$$\text{Laser current } I_{op} = \frac{\text{Voltage across R458}}{10\Omega}$$

⑥ Tracking Balance Adjustment



1. Connect the oscilloscope to TP11(T IN), TP10(GND).
2. Connect a center of SFR401(TE) to ground.
3. Turn on the power switch.
4. Insert disc YEDS-18 (YEDS-1) and press the \triangleright PLAY button.
5. Adjust SFR451(TB) so that the waveform on the oscilloscope is vertically symmetrical as shown in the figure below.



VOLT/DIV : 20mV
TIME/DIV : 2msec

6. After adjustment is completed, remove the ground lead wire.

⑦⑧ Focus/Tracking Gain Adjustment

A frequency response analyzer is necessary in order to perform this adjustment exactly.

However, this gain has a margin, so even if it is slightly off, there is no problem. Therefore, do not perform this adjustment.

Focus/tracking gain determines the pick-up follow-up (vertical and horizontal) relative mechanical noise and mechanical shock when 2-axis device operate.

However, as these reciprocate, the adjustment is at the point where both are satisfied.

- When gain is raised, the noise when the 2-axis device operates increases.
- When gain is lowered, it is more susceptible to mechanical shock and skipping occurs more easily.
- When gain adjustment is off, the symptoms below appear.

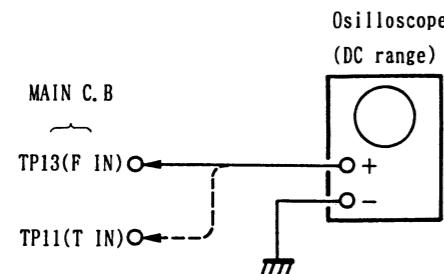
Symptoms	Gain	Focus	Tracking
● The time until music starts becomes longer for STOP → ▶ PLAY or automatic selection (◀, ▶ buttons pressed.) (Normally takes about 2 seconds.)		low	low or high
● Music does not start and disc continues to rotate for STOP → ▶ PLAY or automatic selection (◀, ▶ buttons pressed.)		—	low
● Disc table opens shortly after STOP → ▶ PLAY.	low or high	—	—
● Sound is interrupted during PLAY. Or time counter display stops progressing.	—	—	low
● More noise during 2-axis device operation.	high	high	—

The following is a simple adjustment method.

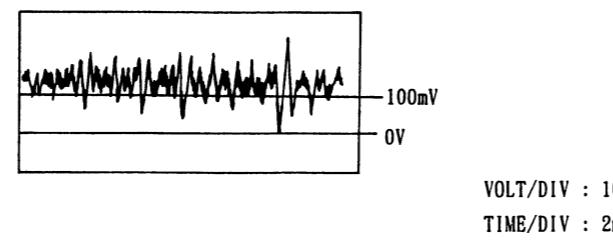
— Simple Adjustment —

Note : Since exact adjustment cannot be performed, remember the positions of the controls before performing the adjustment. If the positions after the simple adjustment are only a little different, return the controls to the original position.

Procedure :

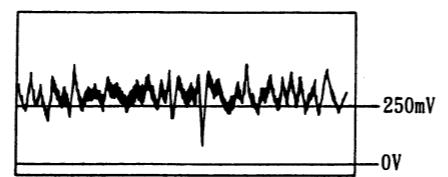


1. Keep the set horizontal. If the set is not horizontal, this adjustment cannot be performed due to the gravity against the 2-axis device.
2. Insert a disc YEDS-18 (YEDS-1) and play back the second track.
3. Connect an oscilloscope to Main circuit board TP13(F IN)
4. Adjustment SFR402 (FE) so that the waveform is as shown in the figure below. (focus gain adjustment)

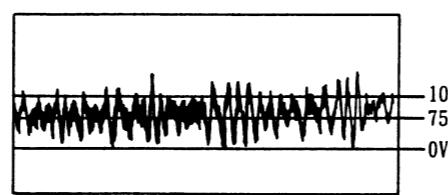


● Incorrect Examples (DC level changes more than on-adjusted waveform)

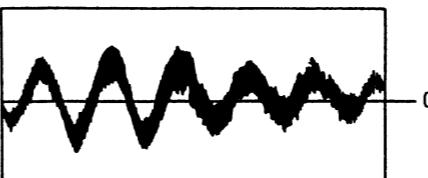
low focus gain



high focus gain

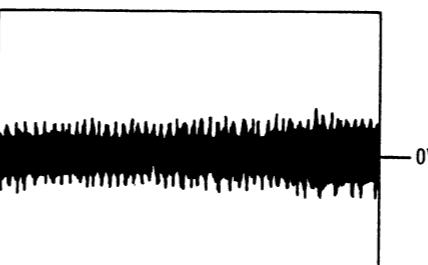


● Incorrect Example (fundamental wave appears)
low tracking gain



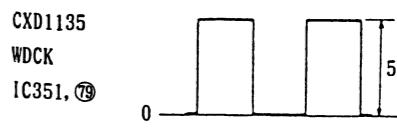
VOLT/DIV : 50mV
TIME/DIV : 2mS

high tracking gain
(higher fundamental wave than for low gain)

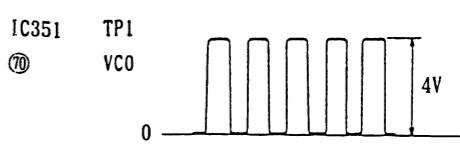


VOLT/DIV : 50mV
TIME/DIV : 2mS

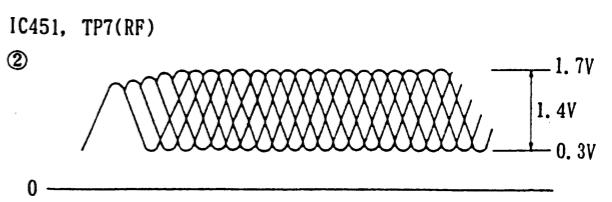
WAVE FORM



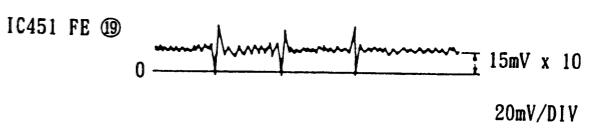
0.2V/DIV
2μS/DIV
f=88.2kHz



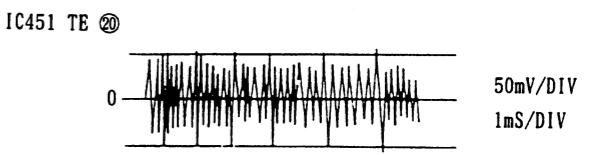
0.2V/DIV
0.2μS/DIV
f=4.0 MHz



20mV/DIV
0.5μS/DIV



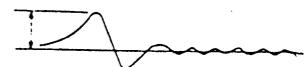
20mV/DIV
2mS/DIV



50mV/DIV
1mS/DIV

TP13(F IN)

① (at FOCUS SEARCH)
≈1.5(V)



VOLT/DIV : 10mV
TIME/DIV : 2mS

5. Connect oscilloscope to Main circuit board TP11(T IN)
6. Adjust SFR401 (TE) so that the waveform is as shown in the figure below. (tracking gain adjustment)



VOLT/DIV : 50mV
TIME/DIV : 2mS

PRACTICAL SERVICE FIGURE

Output level : $1.4 \pm 0.2V$
Distortion : Less than 0.06 %
Frequency response : $0 \pm 2dB$
(TR - 3,4,5,6) $(20Hz, 100Hz, 10kHz, 20kHz)$

IC DESCRIPTION

For the description of pins as shown below, see the manual of the XC-002.			
	DX-D 9 1	XC-0 0 2	
①	IC, CXA1082BQ	IC, CXA1082S	
②	IC, CXA1081S	IC, CXA1081S	

IC, CXP5058H-554Q

Pin No.	Pin Name	I/O	Description	
1	H-SPD	O	Low in high-speed mode.	
2	A-MUTE		Analog mute output. High when emphasis is on.	
3	EMPH		Emphasis switching output. High when emphasis is on.	
4	H-EMPH		High when emphasis is on and in high-speed mode.	
5	x	O	Display segment output.	
6	a			
7	b			
8	c			
9	d			
10	e			
11	f			
12	g			
13	y			
14	z			
15	p			
16	NC	-	Reserved.	
17	NC			
18	NC			
19	NC			
20	9 G	O	Display grid scan output.	
21	8 G			
22	7 G			
23	6 G			
24	5 G			
25	4 G			
26	3 G			
27	2 G			
28	1 G			
29	SCOR	I	Sub-code S0 + S1 input interrupt at the leading edge.	
30	XTAL	-	Connected to the ceramic oscillator. 4.19 MHz	
31	EXTAL	I		
32	RST	I	Reset input.	
33	NC	-	Reserved.	
34	VDD	-	Power input terminal. Connected to +B.	

Pin No.	Pin Name	I/O	Description
3 5	KEY 1	I	KEY input.
3 6	KEY 2		
3 7	KEY 3		
3 8	KEY 4		
3 9	KEY 5		
4 0	EOP・OFF	-	Connected to GND.
4 1	NC	-	Reserved.
4 2	SYNC	I/O	Sync. signal to other components input or output. (8-bit serial)
4 3	NC	-	Reserved.
4 4	SQCK	I	Sub-code Q read and clock input.
4 5	GFS		Display signal input for frame sync. lock status.
4 6	SUBQ		Sub-code Q input.
4 7	MUTG	O	Muting output to DSP.
4 8	SENS	I	Connected to DSP SENS terminal.
4 9	XRST	O	System reset output.
5 0	DATA	O	Serial data output to DSP.
5 1	XLT	O	Data latch output.
5 2	CLK		Data transmission clock.
5 3	OPEN		Tray open output. High when opening.
5 4	CLOSE		Tray close output. High when closing.
5 5	SW OPEN	I	Tray open detection switch. Low when the tray is open.
5 6	SW CLOSE		Tray open detection switch. Low when the tray is closed.
5 7	FOK		Indicates the status of focus. High when in focus.
5 8	P・S MODE		P・S 1 mode: High when peak search is performed every recording. P・S 2 mode: Low when if the disc has not been changed and the program has not been revised, only the peak point is played back.
5 9	LDON	O	Laser diode ON/OFF output. High when the laser diode is on.
6 0	P-OFF	O	System ON/OFF output. High when power is off.
6 1	P-CONT	I	System ON/OFF output from other components.
6 2	RMC	I	42-bit serial remote control input.
6 3	NC	-	Reserved.
6 4	RANDOM	O	Indicates random play operation. High in random mode. (Reserved)
6 5	P・HOLD		Holds the peak of input signal from other components in the peak search mode. High when peak search mode.
6 6	AD START		Initial signal and AD START pulse output to the A/D conversion circuit.
6 7	COMP	I	Timing signal input for A/D conversion.
6 8	T-RANDOM		Random switch input. Low during random play and timer random play.
6 9	T-PLAY		Timer play mode switch input. Low in timer play mode.
7 0	PSW		Power switch input. ON/OFF (STANDBY) is switched.
7 1	GND	-	Connected to GND.
7 2	NC	-	Reserved.
7 3	NC	-	Reserved.
7 4	WDCK	I	Reference clock input for the peak search (AD conversion circuit)
7 5	VREF	-	Connected to +B.
7 6	VFD P	-	Power input for FL tube display output. Connected to -B.

Pin No.	Pin Name	I/O	Description
77	P-OFF	O	Low when power is off.
78	8/12		High when the play time of the disc is less than 23 minutes.
79	NC	-	Reserved.
80	NC	-	Reserved.

I C, CXD1135Q

Pin No.	Pin Name	I/O	Description
1	FSW	O	Output to switch the time constant of the spindle motor output filter.
2	MON	O	Spindle motor on/off control output.
3	MDP	O	Spindle motor drive output. Coarse control in the CLV. S mode and phase control in the CLV. P mode.
4	MDS	O	Spindle motor drive output. Speed control in the CLV. S mode.
5	EFM	I	Inputs an EFM signal from the RF amplifier.
6	ASY	O	Output to control the slice level of the EFM signal.
7	LOCK	O	The GFS signal is sampled by the WFCK/16. When the GFS signal is "H", this pin outputs "H", and when the signal is "L" 8 times continuously, it outputs "L".
8	VCOO	O	VCO output. When this is locked to the EFM signal. f=8,6436MHz
9	VCOI	I	VCO input
10	TEST	I	Connected to GND.
11	PDO	O	Phase comparison output between the EFM signal and VCO/2.
12	VSS	-	GND (0V)
13	CLK	I	Inputs a clock signal for the serial data transfer from CPU. Latches data at the rise of the clock signal.
14	XLT	I	Latch input from CPU. Latches 8 bit shift register data (serial data from CPU) to each register.
15	DATA	I	Inputs serial data from CPU.
16	XRST	I	System reset input. The system is reset at "L" input.
17	CNIN	I	Tracking pulse input.
18	SENSE	O	Outputs the internal state according to the address.
19	MUTG	I	Muting input. When the ATT in the internal register is "L", the system is in the normal state if the MUTG is "L" and the sound is muted if the MUTG is "H".
20	CRCF	O	Outputs the CRC checking result of sub-code Q. (Reserved)
21	EXCK	I	Clock input for the sub-code serial output. Connected to GND.
22	SBSO	O	Sub-code serial output. (Reserved)
23	SUBQ	O	Sub-code Q output.
24	SCOR	O	Sub-code sync S0+S1 output.

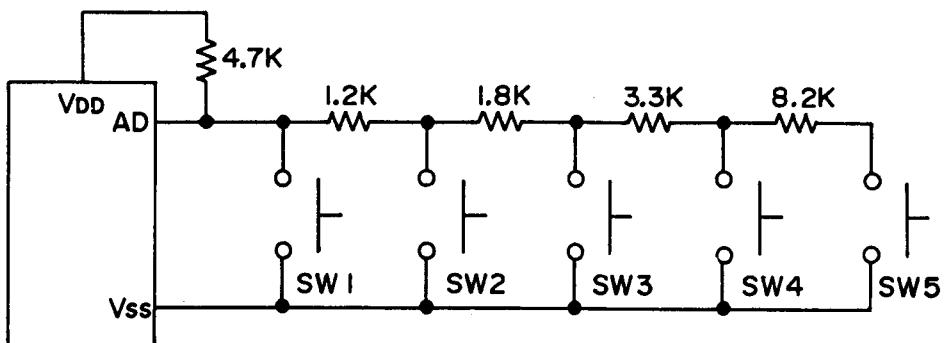
Pin No.	Pin Name	I/O	Description
25	SQCK	I/O	Clock signal for reading of sub-code Q.
26	SQEX	I	SQCK select input. Connect to VDD.
27	DOTX	O	Digital Audio interface output (WFCK is output when being off). (Reserved)
28	GFS	O	Output of the frame sync locking state. Goes "H" when locked.
29	DB 8	I/O	Data pin of the external RAM. DATA 8 (MSB)
30	DB 7	I/O	Data pin of the external RAM. DATA 7
31	DB 6	I/O	Data pin of the external RAM. DATA 6
32	DB 5	I/O	Data pin of the external RAM. DATA 5
33	VDD	-	Power supply (+ 5 V).
34	DB 4	I/O	Data pin of the external RAM. DATA 4
35	DB 3	I/O	Data pin of the external RAM. DATA 3
36	DB 2	I/O	Data pin of the external RAM. DATA 2
37	DB 1	I/O	Data pin of the external RAM. DATA 1 (LSB)
38	RA 1	O	Address output of the external RAM. ADDR 0 (LSB)
39	RA 2	O	Address output of the external RAM. ADDR 1
40	RA 3	O	Address output of the external RAM. ADDR 2
41	RA 4	O	Address output of the external RAM. ADDR 3
42	RA 5	O	Address output of the external RAM. ADDR 4
43	RA 6	O	Address output of the external RAM. ADDR 5
44	RA 7	O	Address output of the external RAM. ADDR 6
45	RA 8	O	Address output of the external RAM. ADDR 7
46	RA 9	O	Address output of the external RAM. ADDR 8
47	RA 10	O	Address output of the external RAM. ADDR 9
48	RA 11	O	Address output of the external RAM. ADDR 10 (MSB)
49	RAWE	O	Outputs the WRITE ENABLE signal to the external RAM (active at "L").
50	RACS	O	Outputs the CHIP SELECT signal to the external RAM (active at "L").
51	C4M	O	1/2 division output of the crystal oscillator. f=4.2336MHz (Reserved)
52	VSS	-	Connect to GND.
53	XTAI	I	Crystal oscillator input. f=8.4672MHz
54	XTAO	O	Crystal oscillator output. f=8.4672MHz (Reserved)
55	MD 1	I	Mode select input 1 used at "H" } Mode select input 2 used at "L" } Connected to GND. } Mode select input 3 used at "L" } Connected to GND. }
56	MD 2	I	
57	MD 3	I	
58	SLOB	I	Input to switch the code of the audio data output. "L" causes the 2 second complement output and "H" causes the offset binary output. Connected to GND.
59	PSSL	I	Input to switch the mode of the audio data output. "L" causes serial output and "H" causes parallel output. Connected to GND.

Pin No.	Pin Name	I/O	Description
60	APTR	O	Aperture correction control output. 44.1 kHz with the filter OFF. (Reserved)
61	APTL	O	Aperture correction control output. 44.1 kHz with the filter OFF. (Reserved)
62	DA 1	O	DA 1 (LSB of parallel audio data) output with PSSL = "H". C1F1 output with PSSL = "L". (Reserved)
63	DA 2	O	DA 2 output with PSSL = "H". C1F2 output with PSSL = "L". (Reserved)
64	DA 3	O	DA 3 output with PSSL = "H". C2F1 output with PSSL = "L". (Reserved)
65	DA 4	O	DA 4 output with PSSL = "H". C2F2 output with PSSL = "L". (Reserved)
66	DA 5	O	DA 5 output with PSSL = "H". C2FL output with PSSL = "L". (Reserved)
67	DA 6	O	DA 6 output with PSSL = "H". C2PO output with PSSL = "L". (Reserved)
68	DA 7	O	DA 7 output with PSSL = "H". RFCK output with PSSL = "L". (Reserved)
69	DA 8	O	DA 8 output with PSSL = "H". WFCK output with PSSL = "L". (Reserved)
70	DA 9	O	DA 9 output with PSSL = "H". PLCK output with PSSL = "L". (Note 1)(Reserved)
71	DA 10	O	DA 10 output with PSSL = "H". UGFS output with PSSL = "L". (Reserved)
72	DA 11	O	DA 11 output with PSSL = "H". GTOP output with PSSL = "L". (Reserved)
73	VDD	-	Power supply (+5 V)
74	DA 12	O	DA 12 output with PSSL = "H". RA0V output with PSSL = "L". (Reserved)
75	DA 13	O	DA 13 output with PSSL = "H". C4LR output with PSSL = "L". (Reserved)
76	DA 14	O	DA 14 output with PSSL = "H". C210 output with PSSL = "L". (Note 2)
77	DA 15	O	DA 15 output with PSSL = "H". C210 output with PSSL = "L". (Reserved)
78	DA 16	O	DA 16 (MSB of parallel audio data) output with PSSL = "H". DATA output with PSSL = "L". (Note 3)
79	WDCK	O	Strobe signal output. 88.2 kHz with the filter OFF.
80	LRCK	O	Strobe signal output. 44.1 kHz with the filter OFF.

Note 1) PLCK: VCO/2 output. When locked to the EFM signal, f=4.3218MHz

Note 2) C210 : Bit clock signal. f=2.1168MHz

Note 3) DATA : Audio signal serial data output



KEY MATRIX

PIN \ VOLTAGE (V)	0 ~ 0.33 (SW1)	0.82 ~ 1.29 (SW2)	1.78 ~ 2.21 (SW3)	2.69 ~ 3.06 (SW4)	3.56 ~ 4.06 (SW5)
FW501①	1	2	3	4	5
FW501②	6	7	8	9	0
FW501③	DISPLAY	REPEAT /BLANK	PROGRAM /CHECK	DELETE	+ 1 0
FW501④	STOP /CLEAR	PAUSE	PLAY /REPLAY	AUTO	RANDOM
FW501⑤	OPEN /CLOSE	F•BWD /B•SKIP	F•FWD /F•SKIP	CONT.	—

KEY SWITCH INPUT VOLTAGE

ANALOG INPUT VOLTAGE	CONDITION	DIGITAL VALUE
0.0 ~ 0.33V	VDD 5V	000
0.82 ~ 1.29V		001
1.78 ~ 2.21V		010
2.69 ~ 3.06V		011
3.56 ~ 4.06V		100
4.62 ~ 5.0V		101

PEAK SEARCH CIRCUIT

④ AD START



Input signals coming from ④ are amplified by IC651 (1/2) and are peak hold at ④. The voltage of ④ is discharged through R657 at the leading edge of AD START ④. When the voltage of ④ is lower than that of ④, the output signals of IC651 (2/2) are inverted. The smaller the number of WDCK signals input to pin ⑭ of IC201 from the leading edge of AD START to the trailing edge of COMP, the greater the peak is judged to be. That point is then recorded. The P•HOLD signals are discharged whenever the voltage of the peak hold circuit is measured.

⑤ COMP



⑥ P•HOLD



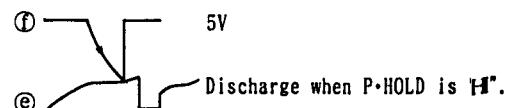
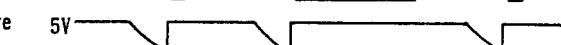
⑦ Sound signal/Rectification input



⑧ P•HOLD

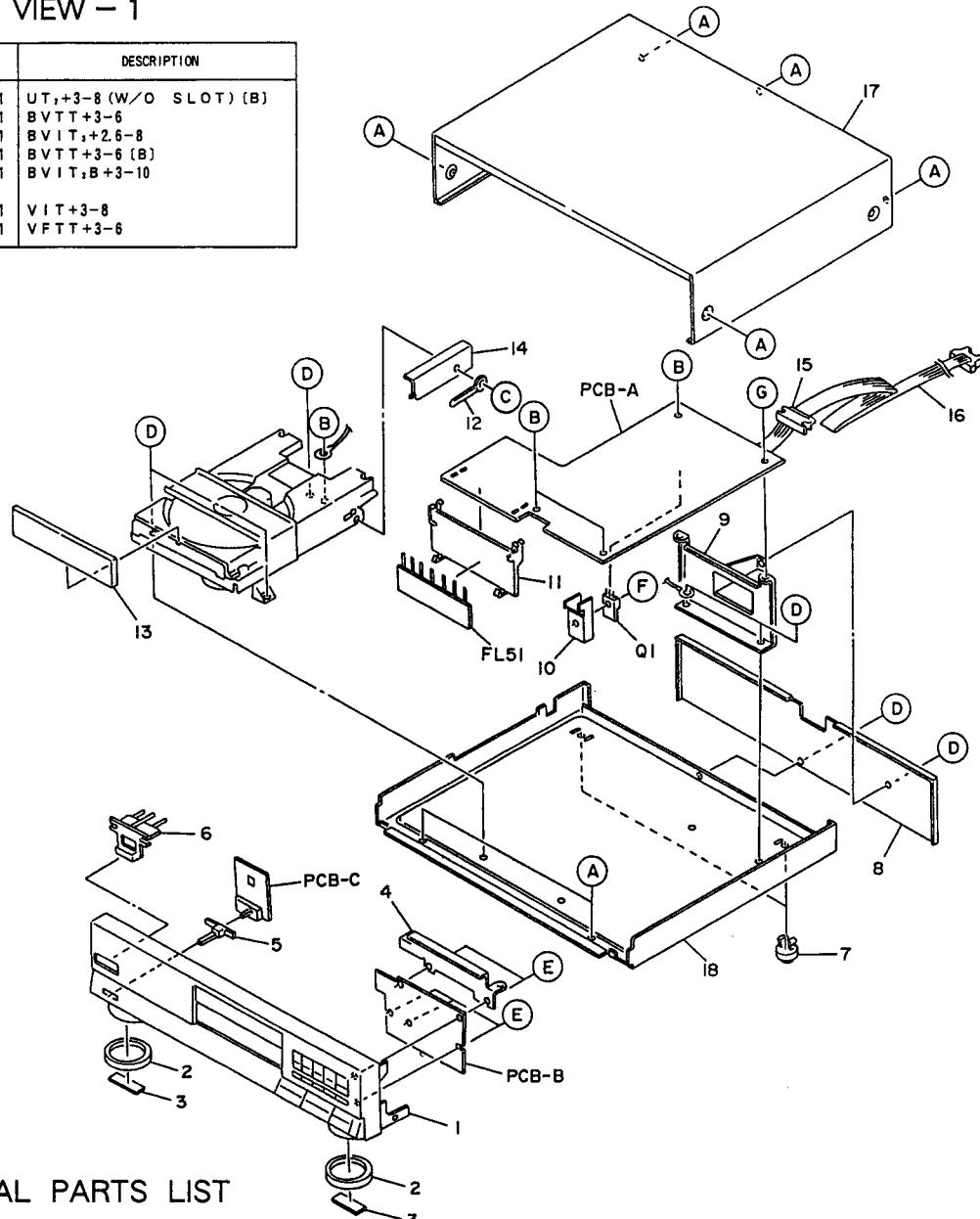


⑨ Discharge



EXPLODED VIEW - 1

REF. NO.	PART NO.	DESCRIPTION
A	87-743-095-41	UT,+3-8 (W/O SLOT) (B)
B	87-067-688-01	BVTT+3-6
C	87-067-686-01	BVIT,+2.6-8
D	87-067-716-01	BVTT+3-6 (B)
E	87-067-680-01	BVIT,B+3-10
F	87-571-095-41	VIT+3-8
G	87-067-566-01	VFTT+3-6

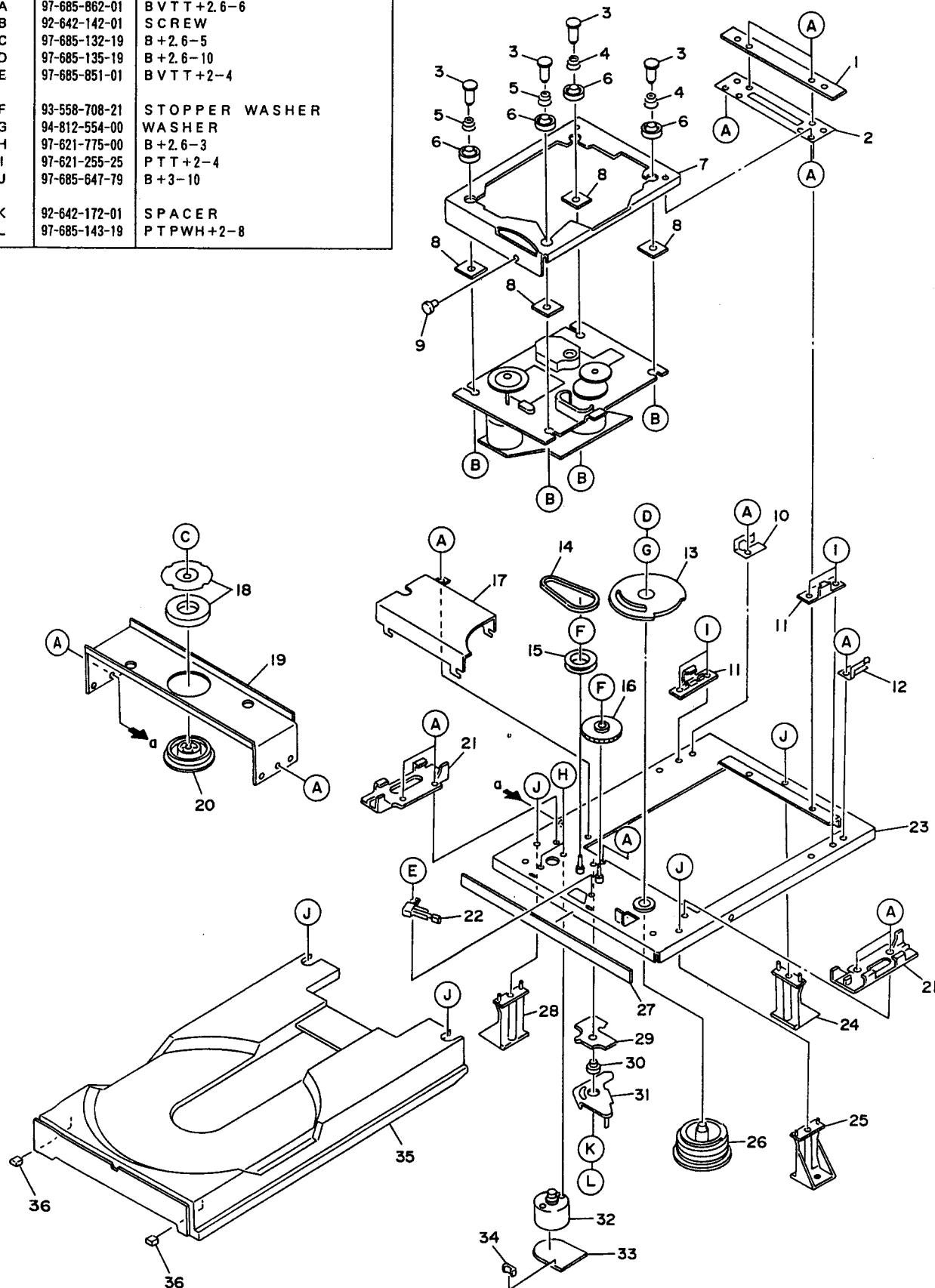


MECHANICAL PARTS LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q' TY
1-1	★09-057-061-010		FRONT CABINET ASSY	※	1
1-2	★89-VW5-005-010		RING, FOOT		2
1-3	★89-VW5-212-010		FELT, FOOT (YN, YJ)		2
1-3	★89-VW5-212-019		FELT, FOOT (YK, YNE)		2
1-4	---		HOLDER, P.C.B		1
1-5	★89-VX5-004-019		KNOB, SL TIMER	※	1
1-6	★89-VP5-011-019		BUTTON, POWER		1
1-7	★87-085-213-019		FOOT, H12.5		2
1-8	★89-VX5-015-019		PANEL, REAR (YN)	※	1
1-8	★89-VX5-019-019		PANEL, REAR (YJ)	※	1
1-8	★89-VX5-020-019		PANEL, REAR (YK, YNE)	※	1
1-9	---		HOLDER, CENTER		1
1-10	---		HEAT SINK CT		1
1-11	89-VX5-202-019		GUIDE, FL	※	1
1-12	---		WIRE BINDER		1
1-13	★89-VX5-010-019		PANEL, TRAY	※	1
1-14	---		HOLDER, MECHANISM		1
1-15	89-VT5-202-010		BUSHING, CORD		1
1-16	---		FLAT CABLE 11P FG		1
1-17	★89-VX5-003-019		CABINET, STEEL	※	1
1-18	---		CHASSIS, MAIN		1

EXPLODED VIEW – 2

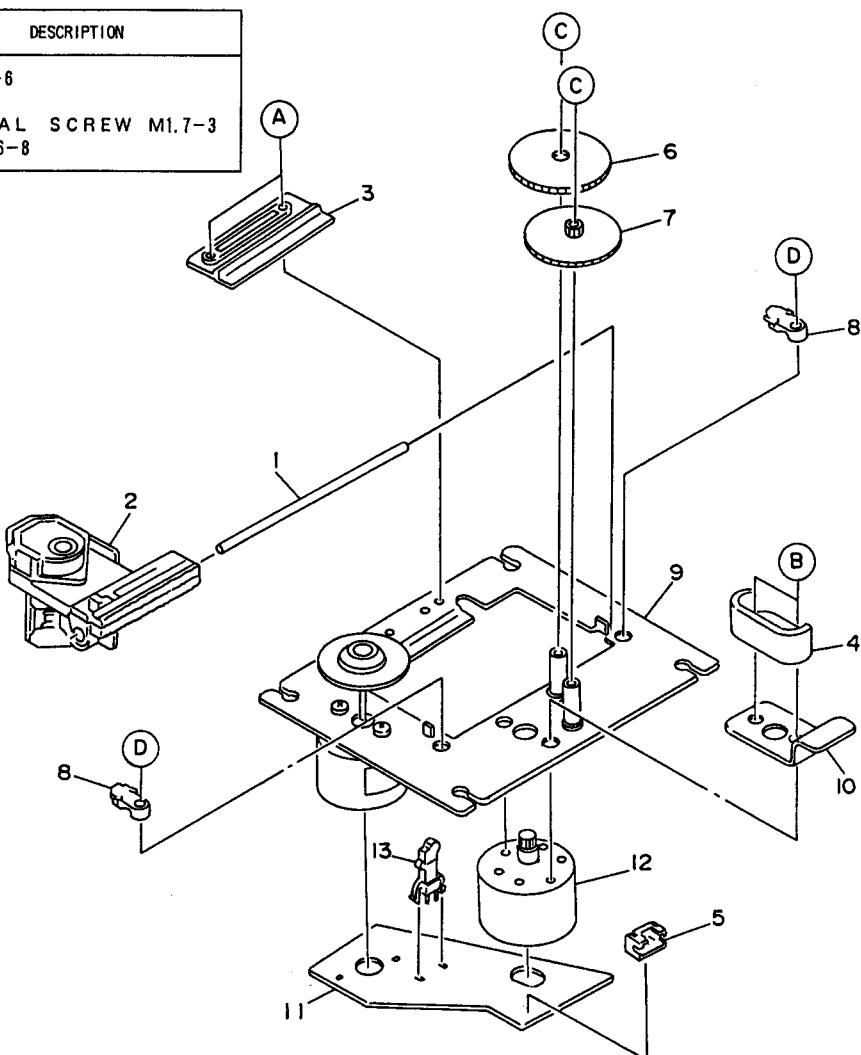
REF. NO.	PART NO.	DESCRIPTION
A	97-685-862-01	B V T T +2.6-6
B	92-642-142-01	S C R E W
C	97-685-132-19	B +2.6-5
D	97-685-135-19	B +2.6-10
E	97-685-851-01	B V T T +2-4
F	93-558-708-21	S T O P P E R W A S H E R
G	94-812-554-00	W A S H E R
H	97-621-775-00	B +2.6-3
I	97-621-255-25	P T T +2-4
J	97-685-647-79	B +3-10
K	92-642-172-01	S P A C E R
L	97-685-143-19	P T P W H +2-8



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q' TY
	2-1	★92-642-170-010	HOLDER, HING		1
	2-2	★92-642-164-010	SPRING, HING		1
	2-3	★92-642-160-010	SHAFT, SPRING T		4
	2-4	★92-642-137-010	SPRING, COIL B		2
	2-5	★92-642-139-010	SPRING, COIL A		2
	2-6	★92-642-158-010	FOOT C		4
	2-7	★9X-264-210-510	SPRING SUB CHASSIS ASSY		1
	2-8	★92-642-159-010	PLATE, SPRING T		4
	2-9	★92-642-169-010	ROLLER		1
	2-10	★92-642-147-010	GUIDE, TRAY L		1
	2-11	★92-642-162-020	HOLDER, TRAY		2
	2-12	★92-642-146-010	GUIDE, TRAY R		1
	2-13	★92-642-154-020	GEAR, SPRING DRIVE		1
	2-14	93-653-387-000	LM BELT		1
	2-15	★94-913-731-010	PULLEY, ROADING		1
	2-16	★92-642-148-010	GEAR, SPRING RELAY		1
	2-17	★92-642-149-010	COVER, SPRING GEAR		1
	2-18	91-452-507-110	MAGNET ASSY		1
	2-19	★92-642-165-010	CHUCK CHASSIS		1
	2-20	★92-642-432-010	CHUCKING PULLEY		1
	2-21	★92-642-161-010	HOLDER, FRONT TRAY		2
	2-22	91-571-312-110	LEAF SWITCH (OPEN/CLOSE)		1
	2-23	★9X-264-210-610	SPRING MAIN CHASSIS ASSY		1
	2-24	★92-642-512-010	MD HOLDER BOSS REAR		1
	2-25	★92-642-510-010	MD HOLDER BOSS		1
	2-26	★92-642-153-010	CAM, SPRING CONTROL		1
	2-27	★92-642-157-030	TAPE, FRONT		1
	2-28	★92-642-511-010	MD HOLDER BOSS L		1
	2-29	★92-642-173-010	PLATE, RING		1
	2-30	★92-642-133-020	BOSS		1
	2-31	★9X-264-210-710	STOPPER RING ASSY		1
	2-32	9X-264-133-610	MOTOR ASSY (LOADING)		1
	2-33	★91-624-793-210	CD MOTOR 2 C.B		1
	2-34	★91-564-721-110	CONNECTOR PIN 5 P		1
	2-35	★92-642-156-010	TRAY		1
	2-36	★92-642-125-010	DAMPER		2

EXPLODED VIEW - 3

REF. NO.	PART NO.	DESCRIPTION
A	92-642-144-01	PTT+2-6
B	97-621-255-35	P+2-5
C	93-303-809-31	SPECIAL SCREW M1.7-3
D	92-641-447-01	STP+2.6-8



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q' TY
	3-1	★94-910-431-010	SHAFT, SLIDE		1
	3-2	98-848-046-510	PICK UP (KSS-150AHRP)		1
	3-3	★92-641-443-010	HOLDER, SLIDE		1
	3-4	★92-641-434-010	COVER, GEAR		1
	3-5	★92-564-720-110	CONNECTOR PIN		1
	3-6	9X-264-076-910	GEAR A		1
	3-7	★92-641-403-050	GEAR B		1
	3-8	★92-641-448-020	CLUMPS, SHAFT		2
※ 3-9	9X-264-133-710	SP MOTOR ASSY (W/CHASSIS, T.T) (DISC) (RF-310T-11400)			1
※ 3-9	9X-264-134-810	SP MOTOR ASSY (W/CHASSIS, T.T) (DISC) (MDN-4RA3NTAS)			1
	3-10	★92-641-371-010	STOPPER		1
※ 3-11	★91-625-848-110	CD MOTOR 1 C. B (RF-310T-11400)			1
※ 3-11	★91-628-263-110	CD MOTOR 1 C. B (MDN-4RA3NTAS/4RA3ETA)			1
※ 3-12	9X-264-077-010	SLED MOTOR GEAR ASSY (SLED) (RF-310T-11400)			1
※ 3-12	9X-264-134-410	SLED MOTOR GEAR ASSY (SLED) (MDN-4RA3ETA)			1
	3-13	91-570-822-210	LEAF SWITCH (LIMIT)		1

※Caution

Two types of the spindle (DISC) motor and sled motor are used, but they are not compatible.

Check the part numbers (MDN ..., RF ...) on the label of motors and replace motors with the same one.